

**Connectedness DEOCS 4.1
Construct Validity Summary**



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Background

In 2014, DEOMI released DEOCS 4.0 for Department of Defense military and civilian members. DEOMI initiated development of DEOCS 4.1 in May 2016. This effort includes various updates to improve climate factors and individual items on the DEOCS. The following paper details the work conducted to develop the factor of Connectedness.

Data Analysis

Sample

This section shows the demographic characteristics of respondents to two separate administrations used to test the new connectedness items (Table 1). *Study 1* consists of participants who completed the DEOCS between 21 June 2016 and 24 June 2016 ($n = 4,682$), and *Study 2* consists of participants who completed the DEOCS between 28 November 2016 and 01 December 2016 ($n = 4,644$). These new items were tested on individuals immediately after they completed the DEOCS. Statistics for each group are presented in the tables below. The demographic data reflect individual respondents' selections (except for branch of Service, which is reported by the organization's survey administrator).

Table 1.
Sample Demographics of Connectedness Items Piloted on DEOCS

	Study 1		Study 2	
	<i>n</i>	%	<i>n</i>	%
Branch of Service				
Army	2,095	44.7%	1,818	39.1%
Navy	1,037	22.1%	1,041	22.4%
Marine Corps	663	14.2%	113	2.4%
Air Force	292	6.2%	1,021	22%
Coast Guard	5	<1%	390	8.4%
National Guard	590	12.7%	216	4.7%
Component				
Active Duty	3,079	92.9%	2,856	92.9%
Reserve	234	7.1%	217	7.1%
Gender				
Male	3,719	79.4%	3,530	76%
Female	961	20.5%	1,113	24%
Seniority				
Junior Enlisted (E1 – E3)	936	24.8%	560	16.9%
Non-Commissioned Officer (E4 – E6)	1,961	52.1%	1,747	52.9%
Senior Non-Commissioned Officer (E7 – E9)	392	10.4%	429	13%
Junior Officer (O1 – O3)	321	8.5%	366	11.1%
Senior Officer (O4 and above)	157	4.2%	202	6.1%

Study 1

Descriptive Statistics and Reliability

This section displays descriptive statistics for the connectedness items from the 21 June 2016 and 24 June 2016 data collection. The scales included *Not at all true for me* to *Very true for me* for three items; *strongly disagree* to *strongly agree*, with the option of selecting *N/A*, for two items; and *Yes/No* for one item.

Table 2.
Frequencies for the items (Study 1)

	Not at all true for me	Untrue for me	Somewhat untrue for me	Somewhat true for me	True for me	Very true for me
1. These days I think I am a burden on people in my life (R)	3,022 64.5%	823 17.6%	261 5.6%	379 8.1%	110 2.3%	87 1.9%
2. These days I feel like I belong	392 8.4%	248 5.3%	358 7.6%	783 16.7%	1,476 31.5%	1,425 30.4%
3. These days, I feel that there are people I can turn to in times of need	291 6.2%	192 4.1%	244 5.2%	690 14.7%	1,403 30%	1,862 39.8%
	Strongly disagree	Disagree	Agree	Strongly Agree	N/A	
4. My future seems dark to me (R)	2,411 51.5%	1,390 29.7%	427 9.1%	149 3.2%	305 6.5%	
5. It is common for members in my unit to consume more than five alcoholic beverages in one sitting (R)	1,002 21.4%	1,243 26.5%	820 17.5%	489 10.4%	1,128 24.1%	
	Yes	No				
6. I know someone in my unit who has thought of, attempted, or died by suicide	1,151 24.6%	3,531 75.4%				

Note. We reverse coded items 1, 4, and 6 so that the positive responses would be on the high end of the scale and the negative responses would be on the low end (for analyses, not frequencies).

Initially, Cronbach's alpha was calculated on all six items, which resulted in an alpha of 0.61. The function "if item deleted" was subsequently added and showed that when item five was removed, the alpha increased to 0.67. When items five and six were removed, alpha increased to 0.75, with no additional benefit from removing more items to increase reliability (See Table 3). Table 4 shows the means for the final four items that emerged.

Additionally, it was determined that item six, "I know someone in my unit who has thought of, attempted, or died by suicide," be included in the final set of items for Connectedness, utilizing a "select all that apply" response scale. This item was examined in Study 2 but kept separate from factor analyses due to the item nature and response scale. Table 5 shows the frequency of responses obtained using Study 2 data.

Table 3.
Reliability analysis for items 1 to 4

	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
These days I think I am a burden on people in my life (R)	.49	.72
These days, I feel like I belong	.60	.66
These days, I feel that there are people I can turn to in times of need	.63	.64
My future seems dark to me (R)	.54	.72

Table 4.
Mean descriptives

	N	Mean	Std. Deviation
These days I think I am a burden on people in my life (R)	4682	5.28	1.21
These days I feel like I belong	4682	4.49	1.53
These days, I feel that there are people I can turn to in times of need	4682	4.77	1.44
My future seems dark to me (R)	4377	3.39	0.80

Table 5.
Frequencies for “I know someone in my unit who has thought of, attempted, or died by suicide” (Study 2)

	Number	Percent
Thought of	571	12.3%
Attempted	150	3.2%
Died by suicide	274	5.9%
Thought of & Attempted	119	2.6%
Thought of & Died by suicide	27	<1%
Attempted & Died by suicide	13	<1%
Thought of, Attempted & Died by suicide	110	2.4%
None of the Above	3380	72.8%

Exploratory Factor Analysis

Next, an Exploratory Factor Analysis (EFA) was conducted using the data collected from 21 June 2016 to 24 June 2016. Two measures to test fit were used. First, the Bartlett Test of Sphericity (BTS; Snedecor & Cochran, 1983) examines the hypothesis that the correlation matrix is an identity matrix. Items were all standardized prior to the running of the analysis. This was completed because items one through three had a different response scale than item four. The obtained value of this test statistic for sphericity was large, and the associated significance level was small (BTS = 5,106.76; $p < .01$). This allows us to reject the null hypothesis that the correlation matrix is an identity, and to conclude that the factor analysis is an appropriate method

to analyze these data (Norusis, 1993). Second, the Kaiser Meyer-Olkin (KMO) measure of sampling adequacy (Kaiser & Rice, 1974) was used to compare the sum of the squared correlation coefficients and the squared partial correlation coefficients. The obtained statistic was .68, indicating a very good fit, and suggests that a factor analysis is an appropriate statistical method to analyze these data. This EFA yielded a single factor solution. Refer to Table 6 for more information.

Table 6.
Exploratory Factor Analysis Pattern Matrix of Connectedness Items

	Component 1
These days I think I am a burden on people in my life	0.74
These days, I feel like I belong	0.78
These days, I feel that there are people I can turn to in times of need	0.79
My future seems dark to me	0.76

Note. All items loaded on to one factor.

Study 2

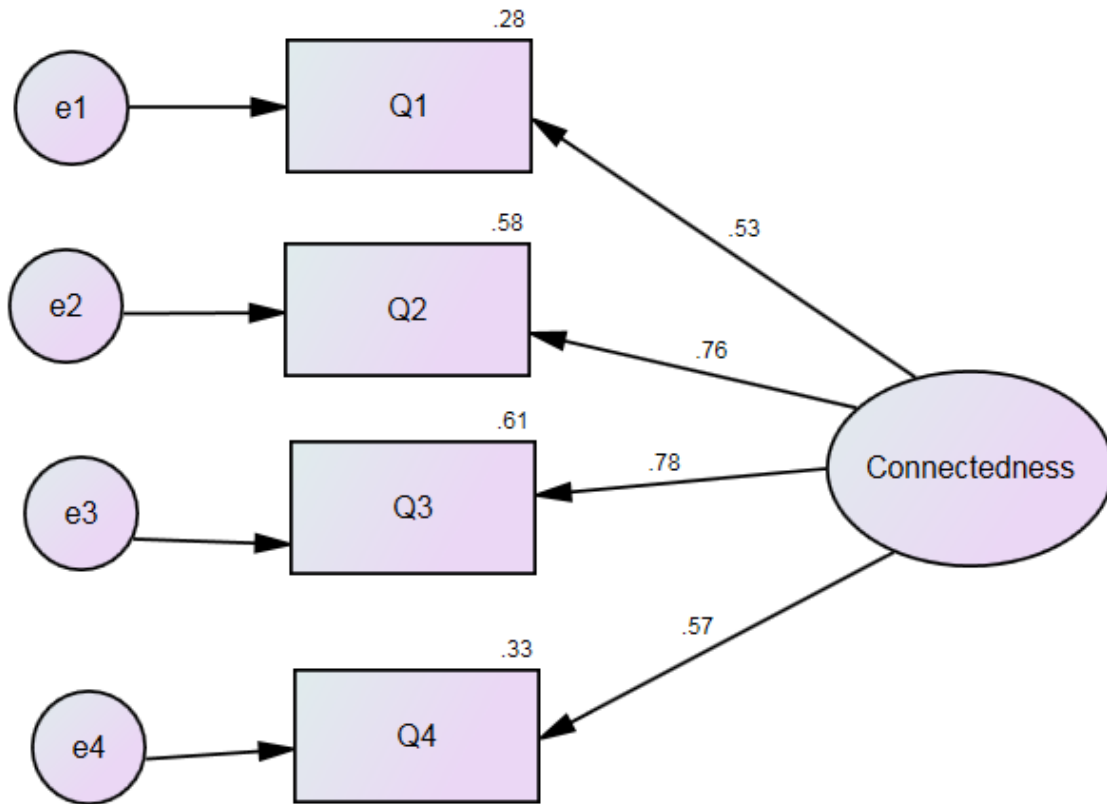
Confirmatory Factor Analysis

A Confirmatory Factor Analysis (CFA) was conducted using the data collected from 28 November 2016 to 01 December 2016. The CFA was conducted using two separate software programs, R and Amos, in order to determine the fit of four items on the pre-specified factor of Connectedness. Table 7 displays the fit indices for both programs, and Figure 1 displays the output of the CFA from Amos.

Table 7.
Confirmatory Factor Analysis Fit Indices

Fit Index	R	Amos
Chi-Square	1006.823 (<i>df</i> = 2; <i>p</i> = 0.00)	1006.606 (<i>df</i> = 2; <i>p</i> = 0.00)
Standardized Root Mean Square Residual (SRMR)	0.096	-
Root Mean Square Error of Approximation (RMSEA)	0.329	0.329
Comparative Fit Index (CFI)	0.815	0.815
Tucker Lew-Index (TLI)	0.444	0.444

Figure 1.
CFA output from AMOS



- Q1:** These days I think I am a burden on people in my life
- Q2:** These days, I feel like I belong
- Q3:** These days, I feel that there are people I can turn to in times of need.
- Q4:** My future seems dark to me

In Figure 1, the first set of numbers (.28, .58, .61, .33) indicates the squared multiple correlations for each item. These provide the percent of variance in a given indicator variable explained by its latent variable (factor), and may be interpreted as the reliability of the indicator. The second set of numbers (.53, .76, .78, .57) indicates standardized regression weights for each item.

The results of both analyses suggest that a one factor solution does not necessarily provide the best fit for these items. Based on the results of these analyses, we suggest presenting Connectedness in two parts (Q1 & Q4; Q2 & Q3) to best represent this construct.

ICC

Intraclass correlations are calculated to determine the amount of variance that can be explained by the unit (LeBreton & Senter, 2008). However, Connectedness has been found to

consist of two sub-factors, each containing two items. Due to the limited number of items per sub-factor, the ICC could not be calculated.

Conclusion

The results from the above analyses suggest that the Connectedness items are considered to be reliable, they map onto a two-factor solution, and they can be aggregated to the unit level. The final five Connectedness items are provided in Table 8. Following administration of DEOCS 4.1, we plan to conduct additional analyses to establish convergent and discriminant validity.

Table 8.

DEOCS 4.1 items for Connectedness

1.	These days I think I am a burden on people in my life (<i>Not at all true for me to Very true of me</i>)
2.	These days, I feel like I belong (<i>Not at all true for me to Very true of me</i>)
3.	These days, I feel that there are people I can turn to in times of need (<i>Not at all true for me to Very true of me</i>)
4.	My future seems dark to me (<i>Strongly disagree to Strongly agree</i>)
5.	I know someone in my unit who has thought of, attempted or died by suicide (<i>Select all that apply</i>)

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